SECTION 2.4

HUMBOLDT BAY WATERSHED MANAGEMENT AREA

The following draws upon information obtained through public input, agency contacts, and the personal experience of Regional Water Board staff. What is presented in this document is a summary of our knowledge regarding water quality issues and the existing and planned actions at this date in time based on current Regional Water Board staff knowledge.

MANAGEMENT AREA DESCRIPTION

This area encompasses tributary waterbodies to the Pacific Ocean from Humboldt Bay north to, and including, Redwood Creek and all groundwater within that area (Figure 2.4-1). Major river systems in this area are the Mad River and Redwood Creek. Other major waterbodies include Humboldt Bay and Mad River Slough, numerous coastal lagoons (Big Lagoon, Stone Lagoon, Freshwater Lagoon), and coastal streams (Elk River, Freshwater, Jacoby, and Maple Creek, and Little River).

Land use in the WMA is primarily timber production, with agricultural uses in the non-forested areas consisting primarily of grazing and dairies. Lily bulb farms are found in the Arcata bottoms and the McKinleyville area. Urbanized areas include Trinidad on the ocean, McKinleyville and Blue Lake on the Mad River, and Arcata and Eureka on Humboldt Bay. Rural residential developments are scattered throughout the timber/grazing interface.

Freshwater streams in this unit support production of anadromous salmonids, including steelhead and cutthroat trout, coho and chinook salmon. The Mad River is the drinking water and industrial supply for the Humboldt Bay Area, and other coastal streams provide drinking water for local communities and individual homes. The deltas of the Elk River and Mad River Slough support commercial and sport shellfish production and harvesting.

Humboldt Bay includes the typical coastal values of an estuarine embayment, as well as an extensive commercial oyster industry. It is a major shipping center for the north coast, the largest such center between San Francisco and Coos Bay, Oregon, and presents the potential for water quality problems associated with industrial uses adjacent to the bay.

IMPLEMENTATION STRATEGY

Significant strategy development and implementation for water quality protection and improvement are occurring in the Humboldt WMA at the present time by many agencies, interest groups, and individuals. We recognize that the WMA problem identification, watershed assessment, and strategy development are an on-going process, and that further input as we proceed will improve the effort. The intent of the Regional Water Board process is to focus resources on the highest priority issues within a given time frame. The issues identified in FY 1996-97 and resultant proposed actions are prioritized in recognition of shifting resources. As such, this document and the implementation of actions to address issues and achieve water quality goals are flexible. Lower priority issues that are not addressed within a planned cycle will be shifted into the following cycle, likely with higher priority so that they will be addressed. Likewise, it is important to note that some activities necessarily will carry through from one cycle to the next, e.g., monitoring, core regulatory programs, etc.

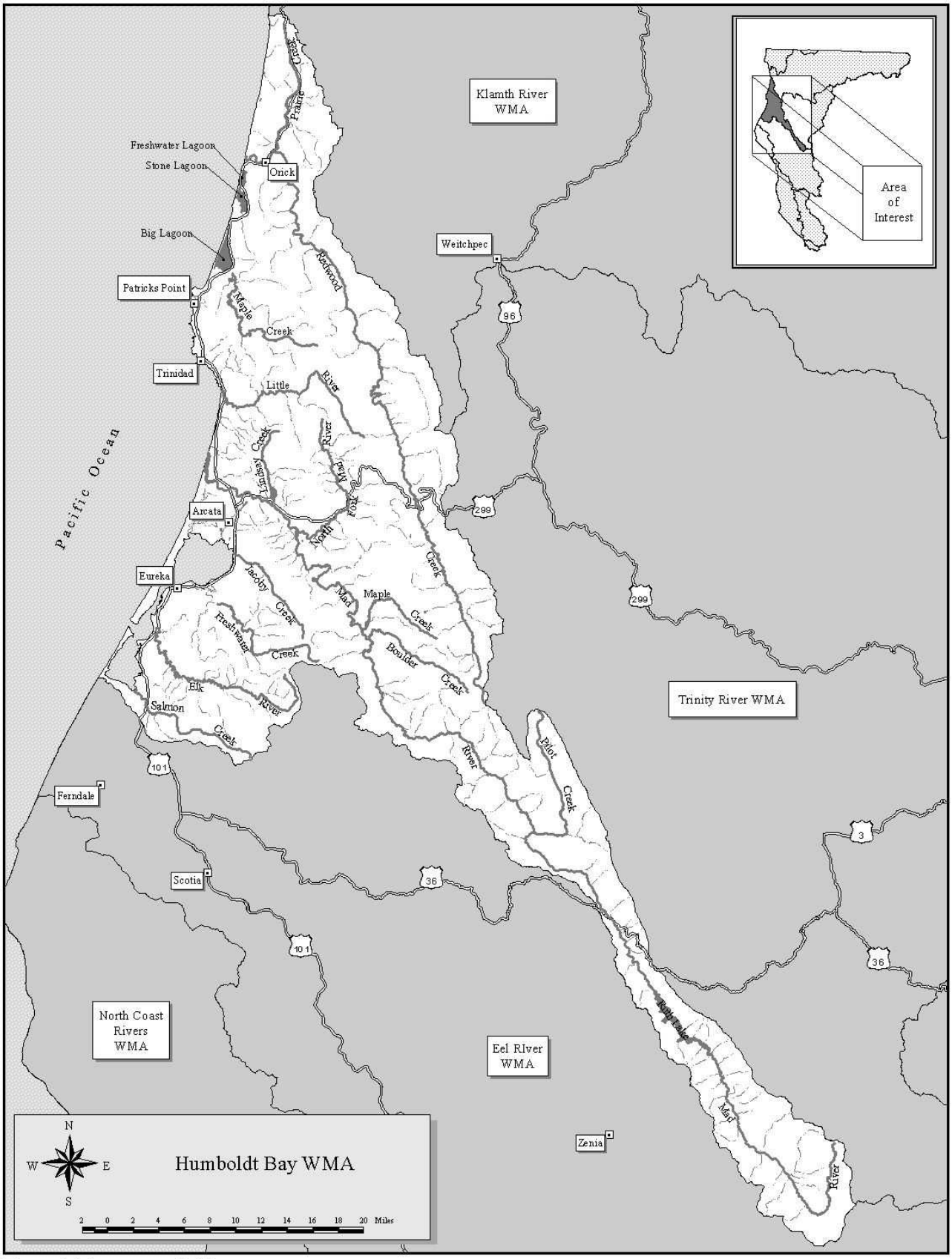

Figure 2.4.1. Humboldt Bay WMA

Institutional framework
This section is not all-inclusive and will be refined through the public participation process. A matrix of each agency's abilities and jurisdictions with respect to the identified goals will be compiled to provide an overall picture for the WMA.

The *Water Quality Control Plan for the North Coast Region* (Basin Plan) contains specific water quality objectives and implementation programs to protect and enhance identified beneficial uses of water. Over-arching regulatory provisions of the Basin Plan are the discharge prohibitions section, which prohibits direct waste discharge to all freshwater surface waters in this management area with the exception of the Mad River and its tributaries. The State's Nonpoint Source Pollution Control Program also is referenced in the Basin Plan and forms the basis for addressing non-timber, nonpoint source pollution, such as from agricultural operations. Likewise, there are regulations within the implementation section of the Basin Plan addressing waste discharges from logging, road building, and associated construction activities. The policies regarding individual wastewater systems contained in the Basin Plan provide guidelines for local agency jurisdictions to prevent water quality degradation from septic systems.

The State *Water Quality Control Policy for the Enclosed Bays and Estuaries of California* provides water quality guidelines for the prevention of water quality degradation and to protect the beneficial uses of bays and estuaries in the state.

The Regional Board has an open public process for permit adoption and renewal, as well as Basin Plan changes. Consistent with that process, a WMA workshop was held in the area on December 4, 1996, and special task forces or work groups may be formed to help identify water quality issues and strategies. With respect to other agencies and groups in the management area, a list is offered for informational purposes in Appendix 2.4-A. It is our intent to continue to coordinate with the listed agencies and groups (and others that may have inadvertently been left out), enhancing our relationships where definite water quality benefits can be realized.

Summary of Activities
The general emphasis in the WMA is to increase coordination and education/outreach, especially regarding erosion control and sedimentation and the handling of toxic materials. Increased assessment activities, including monitoring coordination, maintaining a watchful eye on traditional point source dischargers and continued high priority forestry related activities are also part of the strategy.

<u>Assessment and Monitoring:</u>
Additional assessment needs were identified for storm water issues, both urban and otherwise. The uses of Humboldt Bay are threatened by runoff contaminants, and the freshwater streams are subject to sedimentation by storm water runoff from eroding areas and from mass wasting (landslides). There is concern that ground water data are not sufficient to describe the condition of ground water in the WMA, and a system to gather and analyze existing information has been suggested.

A monitoring workshop has been suggested to improve coordination, standardize protocols, develop an information bank, and foster a volunteer monitoring program. Likewise, the need to monitor both the implementation and effectiveness of watershed enhancement efforts should be addressed. Long-term monitoring programs are present to some degree, but would benefit from additional coordination. For instance, the bacterial data collected on Humboldt Bay for determining oyster harvest conditions may benefit from a broader data analysis. Continuing to promote the use of State funds for the State Mussel Watch Program and Toxic Substances Monitoring Program is a high priority, so that we maintain a watch on toxic chemical accumulation in food and fauna, and the

ability to detect hot spots. The State Mussel Watch Program, a sentinel monitoring program for toxic chemicals, has provided valuable information on occurrence of toxic chemicals that has guided cleanups around the bay. Current activities relating to water quality in the Eureka Waterfront area are guided by information from that program, the Bay Protection and Toxic Cleanup Program, and ground water monitoring and assessment activities.

Two new state programs will improve monitoring and assessment in the WMA began in FY 2000-01 and will continue:

The North Coast Watershed Assessment Program (NCWAP) is a multi-agency approach to gathering, developing, analyzing and presenting watershed assessments and data for north coast watersheds. NCWAP is funded to assess the health and status of all watersheds in the north coast region in a 7 year rotation basis. In addition to the North Coast Water Board four agencies within the Resources Agency are involved: Department of Fish and Game, Department of Forestry and Fire Protection, Department of Conservation, Division of Mines and Geology, and Department of Water Resources. Each has specific tasks to gather existing data, fill information gaps by collecting new data, analyze the data, and present the watershed assessment products in a standardized format for agencies, landowners, and watershed groups to use in future restoration and land management activities. In addition to Resource Agency staff, the NCWAP program will closely work with previously established watershed groups and Federal agencies, such as USGS and the National Parks Service, to obtain the most current information and address all issues of concern specific to that watershed. Final assessment products, including all data compiled for the report, will be publicly available on the World Wide Web and on compact disks. NCWAP will be closely coordinated with SWAMP and the outreach functions of the WMI Coordinator at the North Coast Water Board. Within this WMA the following streams are scheduled for assessment in the next three fiscal years: FY 2000-01—Redwood Creek; FY 2001-02—coastal streams north of the Mattole River

The Surface Water Ambient Monitoring Program (SWAMP) is a regionwide monitoring program that will monitor permanent stations for long-term trends as well as rotate into WMAs on a five-year basis. Redwood Creek at Orick and the Mad River at Blue Lake are scheduled as a permanent station, sampling to begin in early 2001. We will be working with local residents in the area to address some of their specific needs as resources allow in FY 2000-01. The rotation for intensive monitoring is scheduled for FY 2001-02 along with the Eel River WMA.

More detail on monitoring priorities and needs are presented in Appendix 2.4-B.

Education and Outreach:

Pollution prevention activities were highlighted by the Watershed Team as a high priority activity. Increased education and outreach should be addressed for erosion control, other storm water issues, confined animal facilities, management and disposal of toxics, monitoring and assessment, and the core regulatory program. Concern was raised at the public workshop that the public does not have a good idea of the level of compliance of various point source dischargers, and that the Regional Water Board staff should present the compliance histories at a public workshop.

Coordination:

Tied in closely with education and outreach is the need for enhanced coordination. We currently participate in a number of activities beyond our day-to-day work that are aimed at improving communication and coordination to the benefit of improved water quality. Included in those actions

are participation in the Humboldt Bay Shellfish Advisory Group and the CalTrans Vegetation Management Advisory Committee, administration of a Clean Water Act 319(h) grant with the Redwood Community Action Agency, close coordination with the local environmental health department, and a group of local agencies and landowners coordinating cleanup activities on the Eureka Waterfront.

Core Regulatory:
The Watershed Team proposes maintaining the current level of point source regulation (inspection, monitoring, and enforcement) on traditional dischargers, while increasing the level of involvement in storm water issues. Included in core regulatory are the underground storage tanks program and addressing the Eureka Waterfront issues. Involvement in the gravel mining issues in the WMA should continue, especially as regards stream channel geomorphology and potential effects on the anadromous salmonid resources.

Ground water:
Ground water issues center around petroleum contamination and Eureka Waterfront problems, however the Watershed Team proposes that efforts should focus on increased coordination, such as follow-up on illegal disposal cases, and additional assessment.

Nonpoint Source:
Continued involvement in forestry issues is necessary to ensure protection of aquatic resources. The listing of chinook salmon in Redwood Creek and coho salmon in the Humboldt WMA as threatened under the federal Endangered Species Act has put the spotlight on all land use activities that may potentially increase sedimentation or otherwise affect habitat. The Team suggested increasing work with local agencies and groups regarding land use impacts on water quality, following the State Nonpoint Source Pollution Control Program strategy of first emphasizing self-determined "voluntary" implementation of controls to reduce nonpoint source pollution. An active outreach program will enhance the effectiveness of the program.

Response to Section 303(d) requirements resulted in a TMDL for Redwood Creek promulgated by USEPA on December 30, 1998. An implementation plan has been written but not adopted by the Regional or State Water Boards. The USEPA will be addressing a TMDL for the Mad River by the end of 2007. Elk River and Freshwater Creek were added (when?) to the Section 303(d) of impaired waterbodies and will be scheduled for similar actions in the future. Additional information is contained in Section 2.7. Issues of listing additional streams in the WMA will be addressed through the Water Quality Assessment process.

Timber Harvest:
We have an extensive Timber Harvest program where staff review and inspect timber harvest plans for implementation of the Forest Practice Rules and best management practices to ensure protection of water quality and beneficial uses. We participate in the Timber Harvest review process as a "review team" agency, with the California Department of Forestry and Fire Protection (CDF) as the lead agency for timber harvest plan review and approval. In our role as a review team agency, we review and make recommendations on timber harvesting plans in an effort to ensure protection of water quality and beneficial uses (i.e., Basin Plan compliance).

An estimated 25% of the timber harvesting in the Region occurs in this hydrologic area that has many waterbodies listed as impaired due to sediment discharges. The primary sources of sediment appear due to surface erosion and mass wasting from timber harvesting and other land use activities. Beneficial uses of primary concern include aquatic habitat (COLD, RARE, WILD, COMM, etc.), recreational uses (REC1 and REC2), and domestic water supplies. In addition, downstream residents

in the Elk River and Freshwater Creek watersheds, both listed under the 303(d) process as impaired due to sediment, have experienced increased rates and magnitudes of flooding. Because of these sediment-impaired waterbodies and threats to water quality in other surface waters, staff are working within the timber harvest plan review process as well as under our own authority to require in-stream water quality monitoring for fine sediments to 1) assess long term water quality trends, 2) evaluate effectiveness of timber harvest-related best management practices and prescriptions in ensuring Basin Plan compliance, and 3) provide a feedback loop for timber owner-operators to allow for timely identification and response to sediment discharges from timber harvest and related activities, as well as to provide information to assist with future timber harvest planning timber sales as well as other projects on U.S. Forest Service lands.

Lower Redwood Creek houses the Redwood National and State Park and is subject to discharges originating from industrial timberlands located upstream. Herbicide application on these timberlands is an issue of concern, but the primary water quality issues are: recovery of threatened and endangered species of coho and chinook salmon and steelhead trout; protection of domestic water supplies; and protection of water quality beneficial uses.

The Pacific Lumber Company (PALCO), the largest of many timber companies in the area, owns approximately 211,700 acres of forestland in Humboldt County, encompassing lands within 22 watersheds including the Elk River and Freshwater Creek watersheds. PALCO conducts timber harvesting and related activities on the lands within its ownership, and the Timber Division is funded to oversee water quality protection of the Habitat Conservation Plan (HCP). The HCP is intended to protect habitat for endangered species and requires that PALCO incorporate interim prescriptions (best management practices) into its timber harvest and harvest-related activities, while performing watershed analysis for the watersheds within its ownership. As watershed analyses are completed, watershed-specific and project-specific prescriptions will be developed, implemented, monitored, and adapted as necessary. In the interim, PALCO is required to conduct several types of monitoring, including interim prescription effectiveness monitoring. To date, PALCO has not implemented in-stream effectiveness monitoring, and has not included instream monitoring for fine sediments (turbidity, suspended sediments) in its other HCP-required monitoring programs that are currently underway. PALCO has been required by State and Regional Water Board orders to monitor water quality in association with some timber harvesting activities.

Regional Board staff believes that the interim prescriptions of the HCP may not be adequate to restore, protect or maintain water quality objectives and beneficial uses in 303(d)-listed waterbodies. Since there is no in-stream effectiveness monitoring, adaptive management cannot adequately address the effectiveness of interim prescriptions.

Local Contracts:
We will continue active involvement in the Clean Water Act sections 319(h) and 205(j) grant programs, the State Water Bond grant program (Prop 13), as well as promoting other programs like the California Department of Fish and Game programs.

Water Quality Planning:
The Basin Plan review process feeds into the activities to the extent issues were identified in the Triennial Review and applicable to the Humboldt WMA. The top priority issues are:

- Review the policy for regulation of underground storage tanks
- Update the policy on disposal of solid wastes, wood wastes, and programs for ash applications
- Consider revisions to the water quality objectives for dissolved oxygen and temperature

- Review the Nonpoint Source Control Measures

Additionally, the water quality attainment strategies for the Section 303(d) waterbodies will be incorporated to some degree into the Basin Plan.

Evaluation and Feedback
We plan to evaluate the overall effectiveness of the process on a yearly basis, adjusting the activities as appropriate. Emerging issues of large magnitude or high priority may cause early re-evaluation and shifting priorities. The final evaluation in FY 2000 –2001 will feed into the next cycle of assessment and problem identification.

ASSESSMENT AND PROBLEM IDENTIFICATION

The following analysis is based on existing knowledge of issues and problems in the Humboldt WMA from long-term monitoring, discharger regulation, water quality planning and nonpoint source program efforts, and public input. However, the following analysis does not constitute a full assessment and will be refined as we move through the assessment phase. As such, a very cursory description and analysis is presented herein.

A public workshop was conducted on December 4, 1996 in Eureka and provided much needed input on problems, issues, and concerns, as well as meaningful and useful ideas to address them. Subsequently, frequent meetings of the Watershed Team have refined the thinking on issues and how to address them. Continued public and interagency involvement will refine the approach in the coming year.

The upper hillslope areas of the WMA, while populated to varying degrees, are primarily occupied by timber production and harvesting activities, with coast redwood as the predominant harvested species. Past practices and continued problems with harvesting techniques and road construction have added to stream sedimentation, in varying degrees, in all the drainages in the WMA.

The lower 40 percent of the Redwood Creek basin houses the Redwood National and State Park, which includes lower Redwood Creek and the Prairie Creek tributary. This protected park is a world famous attraction for tourists and researchers. Prairie Creek and its tributaries are considered by some as “reference watersheds” or ones that are in the most pristine condition for comparison to lands that have been altered by human presence. Private landowners conduct grazing and timber harvesting activities in the estuary and upper reaches of the watershed. A small population of people lives in the town of Orick near the mouth of Redwood Creek. Sedimentation is a problem within lower Redwood Creek perhaps resulting from past harvesting activities, as noted by National Park staff. Assessments by National Park staff document problem areas and suggest follow-up coordination for implementing controls in conjunction with local landowners, USGS, and the Department of Fish and Game, and Humboldt State University. National Park and USGS staff, along with graduate students and local landowners, closely monitors fish populations, temperature, and channel changes on Redwood Creek. This watershed has won worldwide acclaim and is most likely one of the best-studied watersheds. When a Water Board Section 303(d) Water Quality Attainment Strategy (“TMDL”) and implementation plan is adopted, existing efforts to monitor activities in the watershed for the benefit and enhancement of the salmonid resources will be coordinated.

The Mad River watershed is mixed private and Forest Service timberland with a long history of timber harvest. Gravel mining occurs in the lower portions of the watershed. The Mad River is Section 303(d) listed for sediment and temperature impacts. The primary issues for the watershed are forestry-related, with urbanization and associated industrial and public point sources. For the Mad River and its tributaries, discharge of waste is allowed only under NPDES permit during the period of

October 1 through May 14 and at 1% of the flow of the receiving water. The McKinleyville Community Services District discharges municipal effluent to the Mad River in compliance with those restrictions. The City of Blue Lake does not discharge directly, disposing of effluent in percolation/evaporation ponds.

Flooding in Freshwater Creek and Elk River has increased in frequency. The increased flood frequency may be related to stream aggradation and sediment discharges.

Coastal tributaries draining to the ocean south of Redwood Creek and north of Salmon Creek face issues related to timber harvest and grazing, much like those that drain to Humboldt Bay. Humboldt Bay tributaries have experienced problems from urbanization and agricultural uses in addition to timber harvest issues. Additionally, they flow into Humboldt Bay and can impact uses there. Local concerns include sedimentation of Freshwater Creek and Elk River and subsequent flooding and domestic water supply degradation. Some industrial timberland owners are developing *Sustained Yield Plans* that will address sensitive watershed issues to some degree.

The majority of the population in this WMA lives in the Humboldt Bay area and the cities of Eureka and Arcata. Suburban growth is occurring in the unincorporated community of McKinleyville, north of Arcata. Flat land areas around the bay are predominantly pastureland with some limited cultivation, primarily lily bulb farms. Humboldt Bay is an important commercial and recreational shellfish growing area, as well as deep-water port.

Historically, wastewater discharges to the Bay impacted the shellfish uses. Recent emphasis on improved treatment and reliability and the consolidation and relocation of the Eureka wastewater plants has significantly reduced the problem. Discharge of treated wastewater to Humboldt Bay is permitted from the Arcata treatment plant and marsh complex in Arcata Bay (north Humboldt Bay) and the Elk River plant which serves the greater Eureka area. The Arcata plant discharges to a constructed marsh/pond complex prior to discharge to Arcata Bay. The Elk River plant times its discharges to out-going tidal flow so that effluent promptly exits the bay. The College of the Redwoods operates a small sewage treatment plant that discharges indirectly to south Humboldt Bay. Contamination from collection system overflows of raw sewage during high intensity rainfall events is a continued threat to commercial and recreational uses of the Bay.

Storm water runoff from all watersheds draining to the Bay convey indicators of bacterial contamination that impacts shellfish harvest. Seasonal and rainfall-based shellfish harvesting closures are in effect to mitigate the effects of nonpoint source runoff. A shellfish Technical Advisory Committee was established in November of 1995 to address nonpoint source runoff issues.

WATER QUALITY GOALS AND ACTIONS

The following goals and supporting actions are in order of priority and reflect the Watershed Team's synthesis of the issues and problems identified from public and agency input. The goals and attendant actions are listed in rough priority as developed by the Watershed Team. Refinement of the goals and strategy through public participation will include scheduling of the actions by fiscal year, seeking support fiscally and otherwise from local agencies and groups, and enhanced interagency and public coordination and cooperation.

The following broad goals provide a perspective from which to view the specific goals and actions presented below: 1) improve coordination, education, outreach, assessment, and monitoring, 2) protect surface and ground water uses for municipal supply, recreation, and industrial shellfish harvest, and 3) protect and enhance the anadromous salmonid resources.

The five goals for the Humboldt WMA are related through the beneficial uses they address:

- **GOAL 1: Protect surface water uses MUN, REC-1, REC-2, NAV, WILD, EST, MAR, MIGR, SPWN, SHELL**
- **GOAL 2: Protect ground water uses MUN, IND, AGR, REC-1, REC-2**
- **GOAL 3: Increase and continue assessment and monitoring**
- **GOAL 4: Protect and enhance cold water fisheries**
- **GOAL 5*:* Protect of commercial and recreational shellfish uses**

Protection of surface water (GOAL 1) for the primary beneficial uses MUN, REC-1 and REC-2 will in most cases protect all other beneficial uses. The MUN (municipal and domestic supply) beneficial use designation is for uses of water for community, or individual water supply systems including, but not limited to, drinking water supply. It demands, therefore, the highest quality of water. The REC-1 (water contact recreation) beneficial use designation is for uses of water for recreational activities involving body contact with water, where ingestion is reasonably possible. This beneficial use also demands a high degree of water quality. If MUN and REC-1 beneficial uses are protected then it follows that agricultural and industrial supplies are also protected which relates GOAL 1 to GOAL 2 (ground water protection). The protection of cold water fisheries (GOAL 4) requires the protection of surface and ground waters (GOALS 1 and 2) along with additional concerns for siltation, habitat loss, low tributary flows and water temperature. The protection of commercial and recreational shellfish uses (GOAL 5) requires high quality water free from bacterial contamination to ensure a safe product and therefore is also related to GOALS 1 and 2. Increased and continued assessment and monitoring (GOAL 3) is necessary to determine whether the other goals are being achieved and whether more action is needed to achieve the goals. Therefore, by protecting the beneficial uses that demand the highest quality waters, most components supporting other beneficial uses will also be protected.

GOAL 1: Protect surface water uses MUN, REC-1, REC-2, NAV, WILD, EST, MAR, MIGR, SPWN, SHELL

Numerous activities occur within the watershed that may result in adverse effects to the beneficial uses of surface waters in the Humboldt Bay Watershed. Beneficial uses identified for this watershed include, municipal and domestic water supply, recreation, navigation, wildlife, estuarine, and marine habitat, as well as providing for migration and spawning of aquatic organisms, and support of shell fish harvesting. These uses may be impaired through discharges to surface water bodies of chemical, biological, and sedimentary materials. Activities that threaten the impairment of surface water beneficial uses include: waste disposal, vehicle and railroad maintenance yard operations, herbicide application, gravel extraction, timber harvesting, dairy operations, automotive wrecking yard or metal recycling activities, wood treatment facilities, publicly owned treatment works, construction activities, and many others. The Regional Water Board has operated a procedure to permit and inspect sewage treatment and industrial facilities that discharge from point sources for many years. Programs for the investigation and control of non-point discharges from municipalities and industries have recently been placed into action.

Storm water runoff from logging activities, construction sites, auto wrecking yards, fleet maintenance yards, and highways is likely to contain sediment and chemical pollutants. These pollutants can have adverse effects on all domestic water supply systems as well as other beneficial uses that have been addressed under separate goals for the Humboldt Bay WMA. Potential impacts from dairies, feedlots, and grazing have yet to be evaluated. Soil and groundwater cleanup sites along the Eureka Waterfront are potential sources of pollutant discharge to Humboldt Bay. Contaminated sites along the waterfront require continuous coordination in order to facilitate redevelopment. Herbicide

application on public and private lands can effect water quality. Continuous compliance with waste discharge requirements at local sewage treatment plants is needed.

Point Source Issues

Current Activities

- Maintenance of basic regulatory programs regulating waste discharges.
- Sampling for petroleum products, including solvents, MTBE, and gasoline and pesticides at POTWs.
- Impose penalties on facilities with repeated non-compliance.

Additional Needs

- Assist treatment plants to seek additional funding to upgrade existing plant operations.
- Seek additional funding to conduct compliance inspections under the storm water program more frequently.

Nonpoint Source Issues

Current Activities

- Reviewing timber company's Sustained Yield Plans and Habitat Conservation Plans for protection of beneficial uses.
- Maintaining an active timber harvest review program and promoting enforcement actions on violations.
- Seek increased funding to develop educational outreach programs and regularly scheduled inspections to assist cattle handlers in identifying and implementing good management practices and the California Rangeland Water Quality Management Plan. Impose penalties on animal facilities with repeated non-compliance.
- Continuing active participation in Vegetation Management Advisory Committee (CalTrans) and assisting CalTrans in the development of a study of herbicide runoff from highway spraying operations.
- Promoting watershed analysis of Humboldt Bay tributaries within the scope of the Pacific Lumber Company Habitat Conservation Plan using the Washington State Department of Natural Resources methodology.
- Following up on MTBE detection at Ruth Lake in the Mad River watershed, as part of the SWAMP in FY 2000-01.

Additional Needs

- Seek funding to improve interagency coordination to assist with identification of problem areas, conduct outreach programs and coordinate enforcement activities for erosion control.
- Encourage local agencies to adopt and enforce local ordinances for erosion control.
- Conduct community education and outreach programs to inform the public and private industries of best management practices and the potential negative impacts if these practices are not implemented
- Perform watershed assessments, such as the NCWAP program, and include bacterial sampling
- Require regular monitoring of water quality at nonpoint source facility discharge points.
- Seek additional funding for regulatory oversight of investigations and cleanups along the waterfront through cost recovery programs and brownfields grants.

- Require regular monitoring of nearby surface water bodies in association with the application of herbicides
- Seek increased funding to conduct inspections and water quality monitoring
- Expedite development of TMDLs for Elk River and Freshwater Creek.

GOAL 2: Protect ground water uses MUN, IND, AGR, REC-1, REC-2
Activities, which occur in the Humboldt Bay WMA, may result in the contamination and degradation of ground water. Beneficial uses identified for ground water in this watershed include: municipal and domestic, industrial, and agricultural water supply, and recreation. These uses may be impaired through discharges to ground water from chemical and biological materials. Ground water quality may be impacted by chemicals from various sources (point and nonpoint), such as the improper and illegal disposal of waste, spills from leaking underground storage tanks, dry cleaners, home-owners, maintenance yards (especially in the old Eureka waterfront area), small wrecking or "junk" yards including home owners who have garbage on their property, inactive mill sites, and bacteria from septic systems and confined animal operations.

Ground water information needs to be gathered and placed into a database system. This system can help to: (1) identify the location of the problem areas of the WMA, (2) identify the location of sensitive areas of the WMA, (3) identify cleanup sites and activities associated with the WMA and (4) identify ground water source areas.

Point Source Issues

Current Activities

- Continuing coordination, cooperation and increasing follow-up activities with various agencies regarding illegal disposal and discharges.
- Continuing to promote the development and application of best management practices for storage, treatment, and disposal of hazardous substances.
- Continuing coordination and cooperation with various local agencies to expediently investigate and remediate problem sites located along the old Eureka waterfront area.
- Continuing regulatory programs for inspections, assessment and enforcement.
- Continuing to monitor on-going activities associated with known ground water contamination
- Bringing all facilities into compliance.

Additional Needs

- Prepare, develop, and implement a program to educate the public about point source discharges and disposals.
- Pursue additional Regional Water Board funding (PYs) for staff and laboratory services to assess and address the illegal disposals and assess ground water quality.
- Ground water monitoring funds

Nonpoint Source Issues

Current Activities

- Identifying sources of existing information, including other agencies and local groups.
- Participating in local outreach programs, such as the Humboldt Bay Symposium

- Administering the new 319(h) grant for dairy waste outreach and implementation in the WMA, including educational meetings with the public and agencies to promote use of wastes at agronomic rates, a Rangeland Management Planning process, disposal of nonpoint source wastes and to increase inter-agency coordination and cooperation.
- Providing information for accessing grant funds for the agricultural community.
- Continuing regulatory programs of inspections, assessment and enforcement.

Additional Needs

- Pursue additional Regional Water Board funding (PYs) to identify ground water monitoring needs and to coordinate functions with other agencies on a watershed basis.
- Pursue additional Regional Water Board funding (PYs) to develop GIS support for the storage, analysis, and assessment of information.
- Prepare, develop, and implement a program to educate the public, local, city, and state agencies, along with private industry, on discharges of toxic chemicals.
- Increase coordination and cooperation with the RCDs and agricultural community to deal with rangeland and confined animal problems, and to advance to Title 27 requirements in order to avoid ground water contamination.
- Prevent access and discharge to waste pits and ponds.
- Pursue additional Regional Water Board funding (PYs) to conduct nonpoint source inspections (and follow-up) and to investigate non-point source problems, and develop a task force to target problem areas or problem management practices.
- Continue to coordinate with the county to review septic system problems to avoid ground water contamination. This includes enforcement of the Basin Plan requirement to ensure that the county reports septic disposal practices and trends.

GOAL 3: Increase and continue assessment and monitoring

This goal will continue to be a high priority to support the prioritization of activities and ensure that staff resources and funding are directed to those areas needing attention. This goal will involve considerable outreach and coordination. A limiting-factors analysis should be conducted to identify obstacles to achieving water quality goals. There are specific process issues that need to be addressed to facilitate assessment and monitoring. They include: a) development of standardized monitoring protocols for shared data sources, b) coordination of monitoring and assessment activities, c) promotion of volunteer monitoring, d) development and maintenance of an information bank for locations of watershed projects, activities, and monitoring, and e) development of long-term monitoring programs. Information needs to be developed in a number of areas to assist in assessments. Additionally, the following specific areas should be monitored to ensure all other goals are being met:

- runoff from urban areas, county, state and federal roads, timberlands, construction and industrial sites
- gravel extraction impacts to channel morphology, wetlands, and other habitat values
- stream sediment with regard to aquatic habitat and flooding.
- chemicals in the estuary that not monitored or assessed in the State Mussel Watch Program
- public swimming areas
- the effectiveness of restoration activities

Within this WMA the following streams are scheduled for NCWAP assessment in the next three fiscal years: FY 2000-01—Redwood Creek FY 2001-02—coastal streams north of the Mattole River.

The SWAMP will monitor Redwood Creek at Orick and the Mad River at Blue Lake as permanent stations; sampling began in early 2001. We will be working with local residents in the area to address some of their specific needs as resources allow. The rotation for intensive monitoring is schedule for FY 2001-02 along with the Eel River WMA.

This goal is not separated by discharger type (point versus nonpoint source) as it encompasses both.

Current Activities

- Maintaining discharger self-monitoring programs.
- Continuing involvement with local efforts to coordinate monitoring.
- A volunteer monitoring workshop was conducted in November 1998 by USEPA and Redwood Community Action Agency to explore opportunities for more volunteer monitoring and to enhance the existing monitoring activities by volunteers.
- The World Wide Web resources being developed by the California Resources Agency at UC Davis should include the Humboldt WMA. They include CERES (California Environmental Resources Evaluation System), and CARA (California Rivers Assessment).

Additional Needs

- Additional monitoring workshops should be held in the Humboldt Bay area to coordinate among private, public groups, HSU, and other agencies with the goal of standardizing monitoring to increase data exchange utility. The workshops should focus on coordinating data collection and analysis activities in the WMA, standardization of monitoring protocols, and volunteer monitoring efforts
- We should coordinate assessment and monitoring activities with local agencies and groups, initially the Redwood Community Action Agency, Humboldt Bay Shellfish TAC, Humboldt County Health Department, Humboldt County Planning Department, Humboldt County Resource Conservation District, Redwood National and State Park, University of California Cooperative Extension, Humboldt State University, College of the Redwoods, Salmonid Restoration Federation, California Coastal Conservancy, Humboldt Fish Action Council, California Department of Fish and Game, US Army Corps of Engineers, Redwood Creek Landowners Association, local timber companies, and North Coast Gravel Association. We also will coordinate with the Division of Water Rights to address water rights issues as they are identified.
- Staff should assist groups wishing to do volunteer monitoring with both time and equipment.
- Information should be gathered on a database locally prior to input to the above resources
- Seek funding for a local Database/GIS System and coordinator.
- To the extent possible the watershed planning approach will identify opportunities for redirection of staff resources into additional assessment and monitoring functions. Additionally, staff will seek out funding to support increasing assessment and monitoring activities in the WMA.
- Public education and outreach should be increased, and focus on our role in these specific areas: discharger inspections, the potential to monitor specific areas in association with the health department, placing educational handouts at local permit

offices, develop a road map of groups/agencies responsible to assist an individual landowner in a given waterbody or type of problem or situation, and erosion control for small and rural landowners. The compliance of local discharges is generally good and should be communicated to the general public. Support and promote educational opportunities for permitting, erosion control, wetlands values, and aquatic habitat restoration, develop a matrix of agencies and responsibilities to distribute at local permit centers, and promote involvement in the California Resources Agency's World Wide Web informational and educational activities.

- Meet Water Quality Attainment targets from the TMDL to reduce erosion and sedimentation and improve water temperatures. Targets can be attained by assisting in the collection of data contributing to assessments in the initial stages, and generating additional data through future monitoring.
- We should investigate the possibility of looking at restoration projects from the standpoints of utility (did they work) and effectiveness (cost/benefit, ease) on a broad basis.
- Obtain dredging records to assist in the assessment of the quantity of upslope erosion and describe the linkage between numerous small upland or upslope activities and larger problems downstream in the waterways.
- Review discharger self-monitoring programs to make them more ecologically significant and include surface water monitoring, perhaps watershed-wide, as appropriate.
- Improve water quality monitoring activities with an emphasis on dairy waste. Encourage self-monitoring with field test sampling kits for ammonia discharges.
- Seek additional funding for staff and laboratory services for special, focussed water quality studies

GOAL 4: Protect and enhance cold water fisheries

The coldwater fishery, specifically trout, steelhead, and salmon, is of concern regarding sedimentation and other potential impacts to habitat and water quality. It is recognized that a number of activities already presented for protecting other uses and enhancing assessment and monitoring will also serve to further this goal, thus they are not repeated here.

The following Nonpoint Source issues and actions were identified by the public, and agencies, and relate directly to concerns about the coldwater fishery:

- Stream sedimentation from various land use activities limits coldwater aquatic uses. Stream sedimentation from rural subdivisions is an issue with regard to aquatic habitat, especially for salmonids. Logging roads are a concern because of the potential to increase runoff and delivery of sediment to local waterbodies on private and federal lands. The Mad River, Redwood Creek, Freshwater Creek and Elk River are listed on the federal Clean Water Act section 303(d) list for sedimentation affecting salmonid populations. Other waterbodies in the Humboldt Bay watershed may be added to the list for excessive sediment in the near future. Strategies for reduction of erosion and sedimentation are needed.
- The function of Redwood Creek estuary is a concern, because it serves as a nursery for newly hatched salmonids who sometimes stay in the estuary as long as 3 years before leaving to the ocean.
- The function of the riparian corridor in the Redwood Creek basin is a major concern because lack of canopy cover and large woody debris, shallow pools, and high

temperatures impact spawning and rearing habitat for threatened and endangered salmonid species.

- Potential impacts from dairies and grazing need to be evaluated. Dairies should be brought up to Chapter 15 standards. Grazing issues include erosion, sedimentation, and water chemistry.
- Potential ground water contamination, such as nutrient loading via ground water to streams, is of concern. Problem sites should receive progressive enforcement per the Nonpoint Source Pollution Control Program.
- Pesticide and herbicide applications on private and public lands are a water quality concern. Use of pesticides and herbicides along roadways, in agricultural operations, in urban areas, and in lily bulb farming and forestlands in the WMA poses a threat to ground and surface waters.

Point Source Issues

At this point in time we have no specific issues to add for point source beyond those already covered.

Nonpoint Source Issues

Current Activities

- Conducting education and outreach: The RCAA 319(h) project(s) include educational components for agriculture, timber, and rural/urban issues. We will continue involvement in that effort.
- Maintaining involvement in gravel mining, especially as relates to channel stability impacts.
- Promote watershed analysis of Humboldt Bay tributaries within the scope of the Pacific Lumber Company Habitat Conservation Plan using the Washington State Department of Natural Resources methodology.

Additional needs

- Promote erosion control educational materials and programs for landowners. Placing educational handouts at local permit offices and performing more outreach was suggested, as well as developing a list of groups/agencies available to assist landowners in a given waterbody or type of problem or situation.
- Tax incentives for erosion control and aquatic restoration activities should be supported and pursued. Decreasing road density on upland slopes and decommissioning problem roads were two potential targets of such an incentive program.
- Implement and enforce best management practices for Nonpoint Source Regulation. This task entails increased inspections and work with construction, agricultural, silvicultural, and urban runoff discharges primarily through grant-funded projects, volunteer monitoring coordination, and public education and outreach to reduce nutrient, sediment, and chemical discharges from nonpoint sources. This task should also address issues associated with land use planning regarding riparian encroachment and flood plain use and encourage local agencies to adopt and enforce local ordinances for such controls. Also, there is a need to increase funding and become more involved in erosion/sedimentation issues in the WMA and perform watershed assessments.
- Require water quality monitoring of THPs by PALCO, and other timer companies, to assess compliance with Basin Plan objectives.

- Address Clean Water Act, section 303(d) - The Mad River, Redwood Creek, Freshwater Creek and Elk River are listed for sediment impairments to anadromous fish resources. Other waterbodies may be listed in the future. The process to establish sediment reduction strategies will involve considerable public outreach, assessment of sources, assessment of impairments, development of quantifiable targets, consideration of feasible solutions to reduce sources, and coordinated monitoring.
- Improve Water Quality Monitoring Activities -See GOAL 3.
- Improve habitat conditions for anadromous fish by assisting and coordinating with CDFG and local agencies and groups in fishery assessment and emerging issues and by promoting grant funding for stream rehabilitation and monitoring.
- Promote enhancement of riparian areas through grant funding, public education and outreach, and coordination and assistance to other agencies and groups to improve its functions for temperature control, buffering land use impacts, bank stabilization, and habitat.
- Increase time for participation in the CalTrans Vegetation Management Advisory Committee.

GOAL 5*:* Protection of commercial and recreational shellfish uses

Humboldt Bay supports a significant commercial oyster industry and is a popular area for recreational shellfishing. Both commercial and sport shellfish resources are impacted by nonpoint source runoff from urban and rural areas and are threatened by point sources. Considerable monitoring is required from the commercial shellfish industry under a conditional harvest regulation to ensure a safe product. Assessment and monitoring over the years has assisted in reducing contamination of the shellfish harvesting areas. Both compliance and special monitoring programs require support and coordination in the future to ensure new sources are addressed and protection of the shellfish resource. Nonpoint sources of pollution can adversely impact commercial and recreational shellfish uses. Water quality monitoring should be expanded to locate pollution sources and monitor the bay for impacts to shellfish resources.

Point Source Issues

Current Activities

- Continuing regulation of point sources of pollution to the Bay.

Additional Needs

- Review and revise existing monitoring programs currently contained in NPDES Permits for the dischargers to Humboldt Bay with specific emphasis on overflows from sewage collection systems.

Nonpoint Source Issues

Current Activities

- The Regional Water Board by Resolution established theHumboldt Shellfish Technical Advisory Committee. Staff will continue to support and encourage the TAC to provide coordination with agencies and a forum for the development of any needed water quality investigations or monitoring.
- Continuing investigations and cleanup activities at the Eureka Waterfront area to eliminate petroleum, metals, and organic chemical pollution and threats.

- Continuing the review of land use practices within the Humboldt Bay Watershed to ameliorate impacts from runoff sources, including, but not limited to timber harvest, pesticide use, urban, industrial and agricultural runoff, and individual waste disposal systems (septic tanks).

Additional Needs

- Bring all dairy operations into compliance with Title 27 to ensure containment of wastes and reduction of runoff generated pollution.
- Support use of the State Mussel Watch Program within the Bay. Review and expand, if appropriate, the scope of the analyses to answer the question, "Are there chemicals in wide use that have not been monitored or assessed with the State Mussel Watch Program?"
- Finalize the report on Bay Protection monitoring activities and findings.
- In cooperation with the Department of Health Services'Shellfish Program, explore pathogen issues in cooperation with the University of California at Davis.
- Coordinate with the Department of Health Services Shellfish Program, the Humboldt County Health Department, and shellfish harvesters, when appropriate, on all monitoring activities.

BUDGET

We will attempt to fund the highest priority actions as identified in the Humboldt WMA to the extent funding constraints allow that, and pursue additional funding for those actions we are unable to address. Monitoring and assessment needs are detailed in Appendix 2.4-B.

Appendix 2.4 - A

Partial listing of agencies and groups in the Humboldt Bay WMA with an interest and/or responsibility for water quality.

United States
- Army Corps of Engineers
- Bureau of Land Management
- Environmental Protection Agency
- Fish and Wildlife Service
- Geological Survey
- Humboldt Bay National Wildlife Refuge
- National Biological Service
- National Marine Fisheries Service
- National Park Service
- Natural Resources Conservation Service

California State
- California Coastal Conservancy
- College of the Redwoods
- Department of Conservation, Division of Mines and Geology
- Department of Fish and Game
- Department of Forestry and Fire
- Department of Health Services
- Department of Pesticide Regulation
- Department of Toxic Substance Control
- Department of Water Resources
- Humboldt State University
- North Coast Regional Water Quality Control Board
- Office of Environmental Health and Hazard Assessment
- State Environmental Protection Agency
- UC Cooperative Extension

Humboldt County
- Agricultural Commissioner's Office
- Department of Environmental Health
- Planning Department

Local Agencies
- Humboldt County Resource Conservation District
- Shellfish Technical Advisory Committee
- Humboldt Bay Harbor District
- local water districts - numerous, to be compiled later
- city planning departments
- city public works departments

Local Industry and Public Interest Groups
- Farm Bureau
- United Dairymen
- Jacoby Creek Watershed Association
- Humboldt Fish Action Council
- American Fisheries Society

Pacific Coast Restoration
North Coast Gravel Association
Trout Unlimited
Salmon Unlimited
California Forestry Association
Redwood Community Action Agency
Redwood Creek Landowners Association
Salmon Forever
Humboldt Watershed Council
Pacific Lumber Company
Simpson Timber Company

Appendix 2.4-B

Monitoring priorities and need detail for the Humboldt Bay Watershed Management Area

Additional assessment by Regional Water Board staff is needed to test hypotheses about support of beneficial uses MUN, REC1, COLD, RARE, or provide assessment information essential for program implementation. They are currently not funded.

The estimates are Regional Water Board needs on a per year basis with desired fiscal years identified.

1. **Spatial Assessment of Contamination - $33,000 (0.3 PY) – FY 01-02**
   Sediment contamination identified from the BPTCP should be combined with existing groundwater and stormwater information and spatially organized to provide an overall picture of the extent of contamination and linkages of surface and groundwater contamination, and to guide future monitoring and assessment activities in the WMA. Primary areas of concern are the Eureka Waterfront (metals, petroleum), stormwater drainages (metals, petroleum), and Arcata Bottoms (animal waste, chemicals, petroleum).

2. **Sedimentation - $376,000 (1.6 PY - 0.5 Redwood, 0.5 Mad, 0.6 F/W & Elk + $200,000) – FY 01-05**
   Redwood and Freshwater creeks and the Mad and Elk rivers are 303(d) listed for sediment impacts. While development of a TMDL by USEPA for the Mad River in the near future will support gathering and assessing existing data to some degree, additional staffing is needed. Implementation of the TMDLs for Redwood Creek and Mad River will require monitoring, as will the development of TMDLs for Freshwater Creek and Elk River.

3. **Water temperature - $26,000 (0.2 PY + $4000 supplies) – FY 00-05**
   The Mad River is 303(d) listed for water temperature effects on salmonid fisheries. Collection of data will assist in development of TMDL strategies to reduce water temperatures. Will be addressed by SWAMP in FY 2001-02 as indicated below.

4. **Chemicals in POTWs - $26,000 (0.1 PY + $15,000) - FY 01-02**
   Petroleum products, including solvents, MtBE, and gasoline, as well as pesticides should be sampled in the influent and effluent of POTWs.

5. **Bacterial Monitoring - $42,000 (0.2 PY + $20,000 lab) – FY 00-02**
   Concerns about bacterial quality of Humboldt Bay and other recreational waters (coastal lagoons, Mad River, Redwood Creek) with regard to enteric bacteria and parasites (*Cryptosporidium* and *Giardia*) should be addressed through a monitoring program linked to remediation. Some work was done on Elk River, tributary to Humboldt Bay, but additional sampling is needed.

6. **Log Mill Biological Assessments - $48,000 (0.3 PY + $15,000) – FY 01-02, 04-05**
   Documentation of conditions and monitoring of the aquatic biota should be conducted to assess the potential problems at historic wood treatment sites at old and existing log mills.

7. **Ruth Lake MtBE - $26,000 (0.1 PY + $15,000) – FY 00-02**
   MtBE was detected in Ruth Lake on the Mad River, upstream of public and private water supplies. Additional sampling is needed to define the extent of the problem. The monitoring program was begun in FY 00-01 and will continue into FY 01-02.

Surface Water Ambient Monitoring Program

The SWAMP will start intensive monitoring in FY 2001-02. Listed below are the planned and proposed monitoring activities under this program.

Long-term monitoring stations

Two long-term stations were established in spring of 2001: Redwood Creek at Orick and Mad River at Blue Lake. Other long-term stations are outlined in the following tables.

Other SWAMP monitoring

Investigation of MTBE concentrations was initiated in Ruth Lake in FY 2000-01 and continues as part of the intensive survey in FY 2001-02.

Intensive survey during the SWAMP rotation in the FY 2001-02

The intensive survey will provide numerous sampling sites in waterbodies in the WMA. Anticipated parameters are general water chemistry, nutrients, metals, and organic chemicals. Evaluation will include temperature conditions in the Mad River and chemicals from POTWs as well as MTBE investigations in Ruth Lake during the intensive survey. To the extent resources allow, concerns at log mill sites and bacterial monitoring during the intensive survey will be addressed.

For FY 01-02, in addition to the two permanent stations, three monitoring stations have been added at Butler Valley downstream of Boulder Creek, at the Ruth Lake outlet, and at the town of Ruth.

Surface Water Monitoring Program Monitoring Stations for the Redwood Creek Hydrologic Unit (107).

Redwood Creek Hydrologic Unit (107) - FY 2001-02 Monitoring Activities					
Station (Type) [1] HUC	Beneficial Use(s)	Monitoring Objectives [2]	Freq [3]	Category(s)	Indicator(s) [4]
RDWDOR (P) 107.10 (Redwood Creek at Orick)	MUN, REC1, REC2, COLD, SPWN, MIGR, WILD	1,2,3,9,10,11,12,13	5 C	Contaminant Exposure, Biological Response, Pollutant Exposure, Habitat	Inorganic Water Chemistry, Chl-a, Nutrients, Total Organic Carbon, Dissolved Oxygen, Water Temperature

Notes:
1. Type: P = Permanent, R = Rotating
2. Monitoring Objectives: From the November 30, 2000 Report to the Legislature, Section VI, Pages 22-25 (Attachment A)
3. Frequency: N = number of samples per FY, C= Conventional Water Chemistry
   O = Organic Water Chemistry
4. Indicator: From the November 30, 2000 Report to the Legislature, Section VII, Table 3, Pages 33-35 (Attachment A)

Trinidad Hydrologic Unit (108)
The Trinidad Hydrologic Unit comprises a portion of the Humboldt Bay Watershed Management Area as identified in the Watershed Planning Chapter.

Little River
Under the Federal Endangered Species Act (ESA), the Little River is wholly contained in the Northern California Evolutionary Significant Unit (ESU) for Steelhead, listed as "threatened" under the ESA in 2000. The National Marine Fisheries Service (NMFS) is currently developing Steelhead critical habitat status and description for this ESU.

Little River is also wholly contained in the California Coastal Evolutionary Significant Unit (ESU) for Chinook salmon. As such, it is designated as critical habitat for Chinook salmon, listed as "threatened" under the ESA in 1999.

Trinidad Hydrologic Unit (108) - FY 2001-02 Monitoring Activities					
Station (Type) [1] HUC	Beneficial Use(s)	Monitoring Objectives [2]	Freq [3]	Category(s)	Indicator(s) [4]
LITCRN (R) 108.20 (Little River at Crannel)	MUN, REC1, REC2, COLD, SPWN, MIGR, WILD	1,2,3,9,10,11,12,13	5 C	Contaminant Exposure, Biological Response, Pollutant Exposure, Habitat	Inorganic Water Chemistry, Chl-a, Nutrients, Total Organic Carbon, Dissolved Oxygen, Water Temperature

Notes: 1. Type: P = Permanent, R = Rotating
2. Monitoring Objectives: From the November 30, 2000 Report to the Legislature, Section VI, Pages 22-25 (Attachment A)
3. Frequency: N = number of samples per FY, C= Conventional Water Chemistry
O = Organic Water Chemistry
4. Indicator: From the November 30, 2000 Report to the Legislature, Section VII, Table 3, Pages 33-35 (Attachment A)

Surface Water Monitoring Program Monitoring Stations for the Mad River Hydrologic Unit (109).
One permanent station and five rotating stations have been established for this HUC. Two stations have been specifically established in Ruth Lake to monitor the extent of MtBE and other fuel by-products including benzene, toluene, ethylbenzene and xylene (BTEX).

Mad River Hydrologic Unit (109). - FY 2001-02 Monitoring Activities					
Station (Type) [1] HUC	Beneficial Use(s)	Monitoring Objectives [2]	Freq [3]	Category(s)	Indicator(s) [4]
MADBLU (P) 109.10	MUN, REC1, REC2, WARM, COLD, SPWN,	1,2,3,9,10,11,12	5 C	Contaminant Exposure,	Inorganic Water Chemistry, Chl-

Mad River Hydrologic Unit (109). - FY 2001-02 Monitoring Activities					
Station (Type) [1] HUC	Beneficial Use(s)	Monitoring Objectives [2]	Freq [3]	Category(s)	Indicator(s) [4]
(Mad River at Blue Lake)	MIGR, WILD, RARE			Biological Response, Pollutant Exposure, Habitat	a, Nutrients, Total Organic Carbon, Dissolved Oxygen, Water Temperature
MADBUT (P) 109.30 (Mad River at Butler Valley, d/s Boulder Creek)	MUN, REC1, REC2, WARM, COLD, SPWN, MIGR, WILD, RARE	1,2,3,9,10,11,12, 14, 15	5 C	Contaminant Exposure, Biological Response, Pollutant Exposure, Habitat	Inorganic Water Chemistry, Chl-a, Nutrients, Total Organic Carbon, Dissolved Oxygen, Water Temperature Channel Morphology, Macroinvertebrate Assemblage
MADRUT (R) 109.40 (Mad River at Ruth)	MUN, REC1, REC2, WARM, COLD, SPWN, MIGR, WILD, RARE	1,2,3,9,10,11,12	5 C	Contaminant Exposure, Biological Response, Pollutant Exposure, Habitat	Inorganic Water Chemistry, Chl-a, Nutrients, Total Organic Carbon, Dissolved Oxygen, Water Temperature
MADOUT (R) 109.40 (Mad River at Ruth Lake Outlet Works)	MUN, REC1, REC2, WARM, COLD, SPWN, MIGR, WILD, RARE	1,2,3,9,11,12	5 C	Contaminant Exposure, Biological Response, Pollutant Exposure Habitat	Inorganic Water Chemistry, Chl-a, Nutrients, Total Organic Carbon, Dissolved Oxygen, Water Temperature, MtBE, BTEX
RL01 (R) 109.40 (Ruth Lake Station #1)	MUN, REC1, REC2, WARM, COLD, SPWN, MIGR, WILD, RARE	2, 3, 9	4	Pollutant Exposure, Habitat	MtBE, BTEX, Dissolved Oxygen, Water Temperature
RLO2 (R) 109.40 (Ruth Lake Station #2)	MUN, REC1, REC2, WARM, COLD, SPWN, MIGR, WILD, RARE	2, 3, 9	4	Pollutant Exposure, Habitat	MtBE, BTEX, Dissolved Oxygen, Water Temperature

Notes: 1. Type: P = Permanent, R = Rotating
2. Monitoring Objectives: From the November 30, 2000 Report to the Legislature, Section VI, Pages 22-25 (Attachment A)

3. Frequency: N = number of samples per FY, C= Conventional Water Chemistry
   O = Organic Water Chemistry
4. Indicator: From the November 30, 2000 Report to the Legislature, Section VII, Table 3, Pages 33-35 (Attachment A)

Surface Water Monitoring Program Monitoring Stations for the Eureka Plain Hydrologic Unit (110).

A total of nine rotating stations have been established in this HUC They include two in Jacoby Creek, two in Freshwater Creek, three in Elk River, and one in Salmon Creek.

Eureka Plain Hydrologic Unit (110) - FY 2001-02 Monitoring Activities					
Station (Type) (1) HUC	Beneficial Use(s)	Monitoring Objectives (2)	Freq (3)	Category(s)	Indicator(s) (4)
JACBAY (R) 110.00 (Jacoby Creek near Bayside)	MUN, REC1, REC2, COLD, SPWN, MIGR, WILD, RARE	1,2,3,4,9,10,11,12,13, 14, 15	5 C	Contaminant Exposure, Biological Response, Pollutant Exposure, Habitat	Inorganic Water Chemistry, Chl-a, Nutrients, Total Organic Carbon, Dissolved Oxygen, Water Temperature, Macroinvertebrate Assemblage, Channel Morphology
JACUP (R) 110.00 (Jacoby Creek - Upper Station)	MUN, REC1, REC2, COLD, SPWN, MIGR, WILD, RARE	1,2,3,4,9,10,11,12,13, 14, 15	5 C	Contaminant Exposure, Biological Response, Pollutant Exposure, Habitat	Inorganic Water Chemistry, Chl-a, Nutrients, Total Organic Carbon, Dissolved Oxygen, Water Temperature, Macroinvertebrate Assemblage, Channel Morphology
FRESHW (R) 110.00 (Freshwater Creek near Freshwater Corners)	MUN, REC1, REC2, COLD, SPWN, MIGR, WILD, RARE	1,2,3,4,9,10,11,12,13, 14, 15	5 C	Contaminant Exposure, Biological Response, Pollutant Exposure, Habitat	Inorganic Water Chemistry, Chl-a, Nutrients, Total Organic Carbon, Dissolved Oxygen, Water Temperature, Macroinvertebrate Assemblage, Channel

Eureka Plain Hydrologic Unit (110) - FY 2001-02 Monitoring Activities					
Station (Type) [1] HUC	Beneficial Use(s)	Monitoring Objectives [2]	Freq [3]	Category(s)	Indicator(s) [4]
					Morphology
FRESUP (R) 110.00 (Freshwater Creek - Upper Station)	MUN, REC1, REC2, COLD, SPWN, MIGR, WILD, RARE	1,2,3,4,9,10,11,12,13, 14, 15	5 C	Contaminant Exposure, Biological Response, Pollutant Exposure, Habitat	Inorganic Water Chemistry, Chl-a, Nutrients, Total Organic Carbon, Dissolved Oxygen, Water Temperature, Channel Morphology
ELKRIV (R) 110.00 (Elk River near Elk River)	MUN, REC1, REC2, COLD, SPWN, MIGR, WILD, RARE	1,2,3,4,9,10,11,12,13	5 C	Contaminant Exposure, Biological Response, Pollutant Exposure, Habitat	Inorganic Water Chemistry, Chl-a, Nutrients, Total Organic Carbon, Dissolved Oxygen, Water Temperature
ELKNFK (R) 110.00 (Elk River - North Fork u/s Jones)	MUN, REC1, REC2, COLD, SPWN, MIGR, WILD, RARE	1,2,3,4,9,10,11,12,13	5 C	Contaminant Exposure, Biological Response, Pollutant Exposure, Habitat	Inorganic Water Chemistry, Chl-a, Nutrients, Total Organic Carbon, Dissolved Oxygen, Water Temperature
ELKSFK (R) 110.00 (Elk River - South Fork u/s Jones)	MUN, REC1, REC2, COLD, SPWN, MIGR, WILD, RARE	1,2,3,4,9,10,11,12,13	5 C	Contaminant Exposure, Biological Response, Pollutant Exposure, Habitat	Inorganic Water Chemistry, Chl-a, Nutrients, Total Organic Carbon, Dissolved Oxygen, Water Temperature
SALHY1 (R) 110.00 (Salmon Creek at Highway 1)	MUN, REC1, REC2, COLD, SPWN, MIGR, WILD, RARE	1,2,3,4,9,10,11,12,13	5 C	Contaminant Exposure, Biological Response, Pollutant Exposure, Habitat	Inorganic Water Chemistry, Chl-a, Nutrients, Total Organic Carbon, Dissolved Oxygen, Water Temperature

Notes: 1. Type: P = Permanent, R = Rotating
2. Monitoring Objectives: From the November 30, 2000 Report to the Legislature, Section VI, Pages 22-25 (Attachment A)

3. Frequency: N = number of samples per FY, C= Conventional Water Chemistry
   O = Organic Water Chemistry
4. Indicator: From the November 30, 2000 Report to the Legislature, Section VII, Table 3, Pages 33-35 (Attachment A)